

9/914323  
JCO2 Res-PTO 24 AUG 2001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

#SA  
PS

Application of: Himmelsbach et al.  
International Application No.: PCT/EP00/01496  
International Filing Date: 24 February 2000 (24.02.00)  
Title: 4-AMINO-QUINAZOLINE AND QUINOLINE  
DERIVATIVES HAVING AN INHIBITORY EFFECT  
ON SIGNAL TRANSDUCTION MEDIATED BY  
TYROSINE KINASES  
Docket No.: 5/1252

Box PCT  
Commissioner of Patents  
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

Prior to commencing examination of the above-captioned application, please amend the application as set forth below.

AMENDMENTS

Please amend the application as set forth below. All references to page and line numbers relate to the published version of the international application, WO 00/51991.

In the Description

On page 1, after the title of the invention, insert the following new paragraph and headings:

--Related Applications

A'

This application is derived from International Application No.  
PCT/EP00/01496, filed February 24, 2000, pursuant to 35 USC §371.

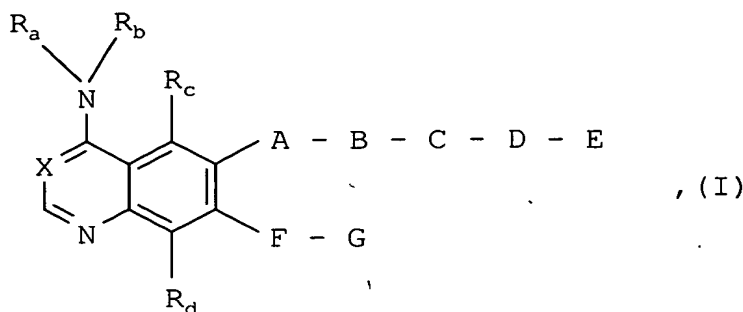
Description of the Invention--

On page 55, at line 11, delete the line of text which reads as follows:

“particularly the compounds characterized in claims 5 to 17,”

On page 55, after line 13, which reads “the tautomers, the stereoisomers and the salts thereof.”, add the new paragraphs that appear on the following pages.

Subgeneric aspect (5) of the invention is bicyclic heterocycles of general formula



wherein

$R_a$  denotes a hydrogen atom or a  $C_{1-4}$ -alkyl group,

$R_b$  denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups  $R_1$  to  $R_3$ , whilst

$R_1$  and  $R_2$ , which may be identical or different, in each case denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

a  $C_{1-4}$ -alkyl, hydroxy,  $C_{1-4}$ -alkoxy,  $C_{3-6}$ -cycloalkyl,  $C_{4-6}$ -cycloalkoxy,  $C_{2-5}$ -alkenyl or  $C_{2-5}$ -alkynyl group,

an aryl, aryloxy, arylmethyl or arylmethoxy group,

a  $C_{3-5}$ -alkenyloxy or  $C_{3-5}$ -alkynyloxy group, wherein the unsaturated moiety may not be linked to the oxygen atom,

a  $C_{1-4}$ -alkylsulphenyl,  $C_{1-4}$ -alkylsulphinyl,  $C_{1-4}$ -alkylsulphonyl,  $C_{1-4}$ -alkylsulphonyloxy, trifluoromethylsulphenyl, trifluoromethylsulphinyl or trifluoromethylsulphonyl group,

a methyl or methoxy group substituted by 1 to 3 fluorine atoms,

an ethyl or ethoxy group substituted by 1 to 5 fluorine atoms,

a cyano or nitro group or an amino group optionally substituted by one or two  $C_{1-4}$ -alkyl groups, wherein the substituents may be identical or different, or

$R_1$  together with  $R_2$ , if they are bound to adjacent carbon atoms, denote a  $-CH=CH-CH=CH-$ ,  $-CH=CH-NH$  or  $-CH=N-NH$  group and

$R_3$  denotes a hydrogen, fluorine, chlorine or bromine atom,

a C<sub>1-4</sub>-alkyl, trifluoromethyl or C<sub>1-4</sub>-alkoxy group,

✓ R<sub>c</sub> and R<sub>d</sub>, which may be identical or different, in each case denote a hydrogen, fluorine or chlorine atom, a methoxy group, or a methyl group optionally substituted by a methoxy, dimethylamino, diethylamino, pyrrolidino, piperidino or morpholino group,

✓ X denotes a methine group substituted by a cyano group or a nitrogen atom,

✓ A denotes an oxygen atom or an imino group optionally substituted by a C<sub>1-4</sub>-alkyl group,

✓ B denotes a carbonyl or sulphonyl group,

✓ C denotes a 1,3-allenylene, 1,1 or 1,2-vinylene group which may be substituted in each case by one or two methyl groups or by a trifluoromethyl group,

✓ an ethynylene group or

A<sub>2</sub> ✓ a 1,3-butadien-1,4-ylene group optionally substituted by 1 to 4 methyl groups or by a trifluoromethyl group,

✓ D denotes an alkylene, -CO-alkylene or -SO<sub>2</sub>-alkylene group wherein the alkylene moiety in each case contains 1 to 8 carbon atoms and additionally 1 to 4 hydrogen atoms in the alkylene moiety may be replaced by fluorine atoms, whilst the linking of the -CO-alkylene and -SO<sub>2</sub>-alkylene group to the adjacent group C in each case must take place via the carbonyl or sulphonyl group,

✓ a -CO-O-alkylene, -CO-NR<sub>4</sub>-alkylene or -SO<sub>2</sub>-NR<sub>4</sub>-alkylene group wherein the alkylene moiety in each case contains 1 to 8 carbon atoms, whilst the linking to the adjacent group C in each case must take place via the carbonyl or sulphonyl group wherein

R<sub>4</sub> denotes a hydrogen atom or a C<sub>1-4</sub>-alkyl group,

✓ or, if D is bound to a carbon atom of the group E, it may also denote a bond

✓ or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl or sulphonyl group,

✓ E denotes an R<sub>6</sub>O-CO-alkylene-NR<sub>5</sub>, (R<sub>7</sub>O-PO-OR<sub>8</sub>)-alkylene-NR<sub>5</sub> or (R<sub>7</sub>O-PO-R<sub>9</sub>)-alkylene-NR<sub>5</sub>-group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 6 carbon atoms, may additionally be substituted by one or two C<sub>1-2</sub>-alkyl groups or by an R<sub>6</sub>O-CO or R<sub>6</sub>O-CO-C<sub>1-2</sub>-alkyl group, wherein

R<sub>5</sub> denotes a hydrogen atom,

a C<sub>1-4</sub>-alkyl group, which may be substituted by an R<sub>6</sub>O-CO, (R<sub>7</sub>O-PO-OR<sub>8</sub>) or (R<sub>7</sub>O-PO-R<sub>9</sub>) group, /

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups, which may be terminally substituted in each case by a C<sub>1-6</sub>-alkylcarbonylsulphenyl, C<sub>3-7</sub>-cycloalkylcarbonylsulphenyl, C<sub>3-7</sub>-cycloalkyl-C<sub>1-3</sub>-alkylcarbonylsulphenyl, arylcarbonylsulphenyl or aryl-C<sub>1-3</sub>-alkylcarbonylsulphenyl group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which may be terminally substituted in each case by a C<sub>1-6</sub>-alkylcarbonyloxy, C<sub>3-7</sub>-cycloalkylcarbonyloxy, C<sub>3-7</sub>-cycloalkyl-C<sub>1-3</sub>-alkylcarbonyloxy, arylcarbonyloxy or aryl-C<sub>1-3</sub>-alkylcarbonyloxy group,

A<sub>2</sub> an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups, each of which may be terminally substituted by a hydroxy, C<sub>1-4</sub>-alkoxy, amino, C<sub>1-4</sub>-alkylamino or di-(C<sub>1-4</sub>-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N-(C<sub>1-4</sub>-alkyl)-imino group,

a C<sub>3-7</sub>-cycloalkyl or C<sub>3-7</sub>-cycloalkyl-C<sub>1-3</sub>-alkyl group,

R<sub>6</sub>, R<sub>7</sub> and R<sub>8</sub>, which may be identical or different, in each case denote a hydrogen atom,

a C<sub>1-8</sub>-alkyl group, which may be substituted by a hydroxy, C<sub>1-4</sub>-alkoxy, amino, C<sub>1-4</sub>-alkylamino or di-(C<sub>1-4</sub>-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom or by a sulphinyl, sulphonyl, imino or N-(C<sub>1-4</sub>-alkyl)-imino group,

a C<sub>4-7</sub>-cycloalkyl group optionally substituted by 1 or 2 methyl groups,

a C<sub>3-5</sub>-alkenyl or C<sub>3-5</sub>-alkynyl group, wherein the unsaturated part may not be linked to the oxygen atom,

a C<sub>3-7</sub>-cycloalkyl-C<sub>1-4</sub>-alkyl, aryl, aryl-C<sub>1-4</sub>-alkyl or R<sub>g</sub>CO-O-(R<sub>e</sub>CR<sub>f</sub>)-group, whilst

R<sub>e</sub> and R<sub>f</sub>, which may be identical or different, in each case denote a hydrogen atom or a C<sub>1-4</sub>-alkyl group and

✓  $R_8$  denotes a  $C_{1-4}$ -alkyl,  $C_{3-7}$ -cycloalkyl,  $C_{1-4}$ -alkoxy or  $C_{5-7}$ -cycloalkoxy group,

✓ and  $R_9$  denotes a  $C_{1-4}$ -alkyl, aryl or aryl- $C_{1-4}$ -alkyl group,

a 4- to 7-membered alkyleneimino group which may be substituted by an  $R_6O-CO$ ,  $(R_7O-PO-OR_8)$ ,  $(R_7O-PO-R_9)$ ,  $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl,  $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or  $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein  $R_6$  to  $R_9$  are as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two  $R_6OCO$  or  $R_6OCO-C_{1-4}$ -alkyl groups or by an  $R_6OCO$ -group and an  $R_6OCO-C_{1-4}$ -alkyl group wherein  $R_6$  is as hereinbefore defined,

A<sup>2</sup> ✓ a piperazino or homopiperazino group which is substituted in the 4 position by the group  $R_{10}$  and is additionally substituted at a cyclic carbon atom by an  $R_6O-CO$ ,  $(R_7O-PO-OR_8)$ ,  $(R_7O-PO-R_9)$ ,  $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl,  $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or  $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein  $R_6$  to  $R_9$  are as hereinbefore defined and

✓  $R_{10}$  denotes a hydrogen atom, a  $C_{1-4}$ -alkyl, formyl,  $C_{1-4}$ -alkylcarbonyl or  $C_{1-4}$ -alkylsulphonyl group,

✓ a piperazino or homopiperazino group which is substituted in the 4 position by the group  $R_{10}$  and additionally at cyclic carbon atoms by two  $R_6O-CO$  or  $R_6O-CO-C_{1-4}$ -alkyl groups or by an  $R_6O-CO$ -group and an  $R_6O-CO-C_{1-4}$ -alkyl group wherein  $R_6$  and  $R_{10}$  are as hereinbefore defined,

✓ a piperazino or homopiperazino group which is substituted in each case in the 4 position by an  $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl,  $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or  $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein  $R_6$  to  $R_9$  are as hereinbefore defined,

✓ a piperazino or homopiperazino group which is substituted in the 4 position by an  $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl,  $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or  $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group and is additionally substituted at cyclic carbon atoms by one or two  $R_6O-CO$  or  $R_6O-CO-C_{1-4}$ -alkyl groups or by an  $R_6O-CO$ -group and an  $R_6O-CO-C_{1-4}$ -alkyl group wherein  $R_6$  to  $R_9$  are as hereinbefore defined,

✓ a morpholino or homomorpholino group which is substituted in each case by an  $R_6O-CO$ ,  $(R_7O-PO-OR_8)$ ,  $(R_7O-PO-R_9)$ ,  $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl,

(R<sub>7</sub>O-PO-OR<sub>8</sub>)-C<sub>1-4</sub>-alkyl or (R<sub>7</sub>O-PO-R<sub>9</sub>)-C<sub>1-4</sub>-alkyl group wherein R<sub>6</sub> to R<sub>9</sub> are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R<sub>6</sub>O-CO or R<sub>6</sub>O-CO-C<sub>1-4</sub>-alkyl groups or by an R<sub>6</sub>O-CO-group and an R<sub>6</sub>O-CO-C<sub>1-4</sub>-alkyl group wherein R<sub>6</sub> is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R<sub>10</sub>, whilst the abovementioned 5- to 7-membered rings are additionally substituted in each case at a carbon atom by an R<sub>6</sub>O-CO, (R<sub>7</sub>O-PO-OR<sub>8</sub>), (R<sub>7</sub>O-PO-R<sub>9</sub>), R<sub>6</sub>O-CO-C<sub>1-4</sub>-alkyl, bis-(R<sub>6</sub>O-CO)-C<sub>1-4</sub>-alkyl, (R<sub>7</sub>O-PO-OR<sub>8</sub>)-C<sub>1-4</sub>-alkyl or (R<sub>7</sub>O-PO-R<sub>9</sub>)-C<sub>1-4</sub>-alkyl group wherein R<sub>6</sub> to R<sub>10</sub> are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R<sub>10</sub>, while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by two R<sub>6</sub>O-CO or R<sub>6</sub>O-CO-C<sub>1-4</sub>-alkyl groups or by an R<sub>6</sub>O-CO-group and an R<sub>6</sub>O-CO-C<sub>1-4</sub>-alkyl group wherein R<sub>6</sub> and R<sub>10</sub> are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an R<sub>6</sub>O-CO-C<sub>1-4</sub>-alkyl, bis-(R<sub>6</sub>O-CO)-C<sub>1-4</sub>-alkyl, (R<sub>7</sub>O-PO-OR<sub>8</sub>)-C<sub>1-4</sub>-alkyl or (R<sub>7</sub>O-PO-R<sub>9</sub>)-C<sub>1-4</sub>-alkyl group wherein R<sub>6</sub> to R<sub>9</sub> are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an R<sub>6</sub>O-CO-C<sub>1-4</sub>-alkyl, bis-(R<sub>6</sub>O-CO)-C<sub>1-4</sub>-alkyl, (R<sub>7</sub>O-PO-OR<sub>8</sub>)-C<sub>1-4</sub>-alkyl or (R<sub>7</sub>O-PO-R<sub>9</sub>)-C<sub>1-4</sub>-alkyl group, while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by one or two R<sub>6</sub>O-CO or R<sub>6</sub>O-CO-C<sub>1-4</sub>-alkyl groups or by an R<sub>6</sub>O-CO-group and an R<sub>6</sub>O-CO-C<sub>1-4</sub>-alkyl group wherein R<sub>6</sub> to R<sub>9</sub> are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 4 C<sub>1-2</sub>-alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 4 C<sub>1-2</sub>-alkyl groups,

a morpholino or thiomorpholino group which is substituted in the 2 position by a C<sub>1-4</sub>-alkoxy group,

a morpholino or thiomorpholino group which is substituted in the 2 and 6 positions by a C<sub>1-4</sub>-alkoxy group,

a C<sub>1-4</sub>-alkyl-NR<sub>5</sub>-group wherein the C<sub>1-4</sub>-alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a di-(C<sub>1-4</sub>-alkoxy)-methyl or tri-(C<sub>1-4</sub>-alkoxy)-methyl group, whilst R<sub>5</sub> is as hereinbefore defined,

a C<sub>1-4</sub>-alkyl-NR<sub>5</sub>-group wherein the C<sub>1-4</sub>-alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group optionally substituted by one or two methyl groups, while R<sub>5</sub> is as hereinbefore defined,

an R<sub>11</sub>NR<sub>5</sub>-group wherein R<sub>5</sub> is as hereinbefore defined and

R<sub>11</sub> denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

or D together with E denotes an R<sub>g</sub>CO-O-(R<sub>e</sub>CR<sub>f</sub>)-O-CO, (R<sub>7</sub>O-PO-OR<sub>8</sub>) or (R<sub>7</sub>O-PO-R<sub>9</sub>)-group wherein R<sub>e</sub> to R<sub>g</sub> and R<sub>7</sub> to R<sub>9</sub> are as hereinbefore defined,

A<sup>2</sup> F and G together denote a hydrogen atom,  
a C<sub>1-6</sub>-alkoxy group optionally substituted from position 2 onwards by a hydroxy or C<sub>1-4</sub>-alkoxy group,  
a C<sub>3-7</sub>-cycloalkoxy or C<sub>3-7</sub>-cycloalkyl-C<sub>1-4</sub>-alkoxy group,

whilst by the aryl moieties mentioned in the definitions of the abovementioned groups is meant a phenyl group which in each case may be monosubstituted by R<sub>12</sub>, mono-, di- or trisubstituted by R<sub>13</sub> or monosubstituted by R<sub>12</sub> and additionally mono- or disubstituted by R<sub>13</sub>, whilst the substituents may be identical or different and

R<sub>12</sub> denotes a cyano, carboxy, C<sub>1-4</sub>-alkoxycarbonyl, aminocarbonyl, C<sub>1-4</sub>-alkylaminocarbonyl, di-(C<sub>1-4</sub>-alkyl)-aminocarbonyl, C<sub>1-4</sub>-alkylsulphenyl, C<sub>1-4</sub>-alkylsulphinyl, C<sub>1-4</sub>-alkylsulphonyl, hydroxy, C<sub>1-4</sub>-alkylsulphonyloxy, trifluoromethyloxy, nitro, amino, C<sub>1-4</sub>-alkylamino, di-(C<sub>1-4</sub>-alkyl)-amino, C<sub>1-4</sub>-alkyl-carbonylamino, N-(C<sub>1-4</sub>-alkyl)-C<sub>1-4</sub>-alkylcarbonylamino, C<sub>1-4</sub>-alkylsulphonylamino, N-(C<sub>1-4</sub>-alkyl)-C<sub>1-4</sub>-alkylsulphonylamino, aminosulphonyl, C<sub>1-4</sub>-alkylaminosulphonyl or di-(C<sub>1-4</sub>-alkyl)-aminosulphonyl group or a carbonyl group, which is substituted by a 5- to 7-membered alkyleneimino group, wherein in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N-(C<sub>1-4</sub>-alkyl)-imino-group, and

R<sub>13</sub> denotes a fluorine, chlorine, bromine or iodine atom, a C<sub>1-4</sub>-alkyl, trifluoromethyl or C<sub>1-4</sub>-alkoxy group or

two groups R<sub>13</sub>, if they are bound to adjacent carbon atoms, together denote a C<sub>3,5</sub>-alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

the tautomers, the stereoisomers and the salts thereof.



Subgeneric aspect (6) of the invention is bicyclic heterocycles of general formula I, wherein

R<sub>a</sub> denotes a hydrogen atom,

R<sub>b</sub> denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R<sub>1</sub> to R<sub>3</sub>, while

R<sub>1</sub> and R<sub>2</sub>, which may be identical or different, each denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

a methyl, ethyl, hydroxy, methoxy, ethoxy, amino, cyano, vinyl or ethynyl group,

an aryl, aryloxy, arylmethyl or arylmethoxy group,

a methyl or methoxy group substituted by 1 to 3 fluorine atoms or

R<sub>1</sub> together with R<sub>2</sub>, if they are bound to adjacent carbon atoms, denote a -CH=CH-CH=CH, -CH=CH-NH or -CH=N-NH group and

R<sub>3</sub> denotes a hydrogen, fluorine, chlorine or bromine atom,

R<sub>c</sub> and R<sub>d</sub> in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an imino group optionally substituted by a methyl or ethyl group,

B denotes a carbonyl group,

C denotes a 1,1- or 1,2-vinylene group which is substituted in each case by one or two methyl groups or may be substituted by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by a methyl or trifluoromethyl group,

D denotes an alkylene or -CO-alkylene group wherein the alkylene moiety in each case contains 1 to 4 carbon atoms, while the linking of the -CO-alkylene group to the adjacent group C in each case must take place via the carbonyl group,

a -CO-O-alkylene or -CO-NR<sub>4</sub>-alkylene- group wherein the alkylene moiety in each case contains 1 to 4 carbon atoms, while the linking to the adjacent group C in each case must take place via the carbonyl group wherein

$R_4$  denotes a hydrogen atom or a methyl or ethyl group,

or, if D is bound to a carbon atom of the group E, it may also denote a bond

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl or sulphonyl group,

E denotes an  $R_6O-CO$ -alkylene- $NR_5$ ,  $(R_7O-PO-OR_8)$ -alkylene- $NR_5$  or  $(R_7O-PO-R_9)$ -alkylene- $NR_5$  group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two  $C_{1-2}$ -alkyl groups or by an  $R_6O-CO$  or  $R_6O-CO-C_{1-2}$ -alkyl group, while

$R_5$  denotes a hydrogen atom,

a  $C_{1-4}$ -alkyl group which may be substituted by an  $R_6O-CO$  group,

A<sup>2</sup> an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted in each case by a hydroxy,  $C_{1-4}$ -alkoxy, di- $(C_{1-4}$ -alkyl)amino,  $C_{1-6}$ -alkylcarbonylsulphenyl,  $C_{3-6}$ -cycloalkylcarbonylsulphenyl,  $C_{3-6}$ -cycloalkyl- $C_{1-3}$ -alkylcarbonylsulphenyl, arylcarbonylsulphenyl or aryl- $C_{1-3}$ -alkylcarbonylsulphenyl group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted in each case by a  $C_{1-6}$ -alkylcarbonyloxy,  $C_{3-6}$ -cycloalkylcarbonyloxy,  $C_{3-6}$ -cycloalkyl- $C_{1-3}$ -alkylcarbonyloxy, arylcarbonyloxy or aryl- $C_{1-3}$ -alkylcarbonyloxy group,

a  $C_{3-6}$ -cycloalkyl or  $C_{3-6}$ -cycloalkyl- $C_{1-3}$ -alkyl group,

$R_6$ ,  $R_7$  and  $R_8$ , which may be identical or different, in each case denote a hydrogen atom,

a  $C_{1-8}$ -alkyl group which may be substituted by a hydroxy,  $C_{1-4}$ -alkoxy, or di- $(C_{1-4}$ -alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, while in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen atom or by an N- $(C_{1-2}$ -alkyl)-imino group,

a  $C_{4-6}$ -cycloalkyl group,

a  $C_{3-5}$ -alkenyl or  $C_{3-5}$ -alkynyl group, while the unsaturated moiety may not be linked to the oxygen atom,

a  $C_{3-6}$ -cycloalkyl- $C_{1-4}$ -alkyl, aryl, aryl- $C_{1-4}$ -alkyl or  $R_gCO-O-(R_eCR_f)$  group, while

✓  $R_e$  and  $R_f$ , which may be identical or different, in each case denote a hydrogen atom or a  $C_{1-4}$ -alkyl group and

✓  $R_g$  denotes a  $C_{1-4}$ -alkyl,  $C_{3-6}$ -cycloalkyl,  $C_{1-4}$ -alkoxy or  $C_{5-6}$ -cycloalkoxy group,

✓ and  $R_9$  denotes a  $C_{1-4}$ -alkyl group,

✓ a 4- to 7-membered alkyleneimino group which is substituted by an  $R_6O-CO$ ,  $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein  $R_6$  is as hereinbefore defined,

✓ a 4- to 7-membered alkyleneimino group which is substituted by two  $R_6O-CO$  or  $R_6O-CO-C_{1-4}$ -alkyl groups wherein  $R_6$  is as hereinbefore defined,

A<sup>2</sup> ✓ a piperazino or homopiperazino group which is substituted in the 4 position by the group  $R_{10}$  and additionally at a cyclic carbon atom by an  $R_6O-CO$ ,  $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein  $R_6$  is as hereinbefore defined and

✓  $R_{10}$  denotes a hydrogen atom, a methyl or ethyl group,

✓ a piperazino or homopiperazino group which is substituted in the 4 position by the group  $R_{10}$  and is additionally substituted at cyclic carbon atoms by two  $R_6O-CO$  or  $R_6O-CO-C_{1-4}$ -alkyl groups wherein  $R_6$  and  $R_{10}$  are as hereinbefore defined,

✓ a piperazino or homopiperazino group which is substituted in each case in the 4 position by an  $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl,  $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or  $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein  $R_6$  to  $R_9$  are as hereinbefore defined,

✓ a piperazino or homopiperazino group which is substituted in the 4 position by an  $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group and is additionally substituted at cyclic carbon atoms by one or two  $R_6O-CO$  or  $R_6O-CO-C_{1-4}$ -alkyl groups wherein  $R_6$  is as hereinbefore defined,

✓ a morpholino or homomorpholino group which is substituted in each case by an  $R_6O-CO$ ,  $R_6O-CO-C_{1-4}$ -alkyl, or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein  $R_6$  is as hereinbefore defined,

✓ a morpholino or homomorpholino group which is substituted by two  $R_6O-CO$  or  $R_6O-CO-C_{1-4}$ -alkyl groups wherein  $R_6$  is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group  $R_{10}$ , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at a carbon atom by an  $R_6O-CO$ ,  $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein  $R_6$  and  $R_{10}$  are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group  $R_{10}$ , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by two  $R_6O-CO$  or  $R_6O-CO-C_{1-4}$ -alkyl groups wherein  $R_6$  and  $R_{10}$  are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an  $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl,  $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or  $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein  $R_6$  to  $R_9$  are as hereinbefore defined,

A2 a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an  $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by one or two  $R_6O-CO$  or  $R_6O-CO-C_{1-4}$ -alkyl groups wherein  $R_6$  is as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 4  $C_{1-2}$ -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 4  $C_{1-2}$ -alkyl groups,

a morpholino group which is substituted in the 2 position by a  $C_{1-4}$ -alkoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a  $C_{1-4}$ -alkoxy group,

a  $C_{1-4}$ -alkyl- $NR_5$  group wherein the  $C_{1-4}$ -alkyl moiety, which is straight-chained, is terminally substituted by a di- $(C_{1-4}$ -alkoxy)-methyl group, while  $R_5$  is as hereinbefore defined,

a  $C_{1-4}$ -alkyl- $NR_5$  group wherein the  $C_{1-4}$ -alkyl moiety, which is straight-chained, is terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group, while  $R_5$  is as hereinbefore defined,

a  $R_{11}NR_5$  group wherein  $R_5$  is as hereinbefore defined and

$R_{11}$  denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

or D together with E denotes an  $R_g\text{CO-O-(R}_e\text{CR}_f\text{)-O-CO}$  or  $(R_7\text{O-PO-OR}_8)$  group wherein  $R_e$  to  $R_g$  and  $R_7$  to  $R_9$  are as hereinbefore defined,

F and G together denote a hydrogen atom,

a  $C_{1-6}$ -alkoxy group optionally substituted from position 2 by a hydroxy or  $C_{1-4}$ -alkoxy group,

a  $C_{4-7}$ -cycloalkoxy or  $C_{3-7}$ -cycloalkyl- $C_{1-4}$ -alkoxy group,

whilst by the aryl moieties mentioned in the definitions of the abovementioned groups is meant a phenyl group which in each case may be monosubstituted by  $R_{12}$ , mono- or disubstituted by  $R_{13}$  or monosubstituted by  $R_{12}$  and additionally mono- or disubstituted by  $R_{13}$ , whilst the substituents may be identical or different and

$R_{12}$  denotes a cyano,  $C_{1-2}$ -alkoxycarbonyl, aminocarbonyl,  $C_{1-2}$ -alkylaminocarbonyl, di- $(C_{1-2}$ -alkyl)-aminocarbonyl,  $C_{1-2}$ -alkylsulphenyl,  $C_{1-2}$ -alkylsulphinyl,  $C_{1-2}$ -alkylsulphonyl, hydroxy, nitro, amino,  $C_{1-2}$ -alkylamino or di- $(C_{1-2}$ -alkyl)-amino, and

$R_{13}$  denotes a fluorine, chlorine, bromine or iodine atom, a  $C_{1-2}$ -alkyl, trifluoromethyl or  $C_{1-2}$ -alkoxy group or

two groups  $R_{13}$ , if they are bound to adjacent carbon atoms, together denote a  $C_{3-5}$ -alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

the tautomers, the stereoisomers and the salts thereof.

Subgeneric aspect (7) of the invention is bicyclic heterocycles of general formula I, wherein

$R_a$  denotes a hydrogen atom,

$R_b$  denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups  $R_1$  to  $R_3$ , while

$R_1$  and  $R_2$ , which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom, or a methyl, trifluoromethyl, methoxy, ethynyl or cyano group,

$R_3$  denotes a hydrogen atom,

$R_c$  and  $R_d$  in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group, or a nitrogen atom,

A denotes an imino group,

B denotes a carbonyl group,

C denotes a 1,1- or 1,2-vinylene group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group,

D denotes a C<sub>1-4</sub>-alkylene group,

a -CO-NR<sub>4</sub>-alkylene group wherein the alkylene moiety contains 2 to 4 carbon atoms, while the linking to the adjacent group C in each case must take place via the carbonyl group, wherein

A<sup>2</sup> R<sub>4</sub> denotes a hydrogen atom,

or, if D is bound to a carbon atom of the group E, it may also denote a bond

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl group,

E denotes an R<sub>6</sub>O-CO-alkylene-NR<sub>5</sub>, (R<sub>7</sub>O-PO-OR<sub>8</sub>)-alkylene-NR<sub>5</sub> or (R<sub>7</sub>O-PO-R<sub>9</sub>)-alkylene-NR<sub>5</sub> group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C<sub>1-2</sub>-alkyl groups or by an R<sub>6</sub>O-CO or R<sub>6</sub>O-CO-C<sub>1-2</sub>-alkyl group, while

R<sub>5</sub> denotes a hydrogen atom,

a C<sub>1-4</sub>-alkyl group which may be substituted by an R<sub>6</sub>O-CO group,

an ethyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted by a C<sub>1-4</sub>-alkylcarbonylsulphenyl, arylcarbonylsulphenyl or arylmethylcarbonylsulphenyl group,

an ethyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted by a hydroxy, C<sub>1-4</sub>-alkylcarbonyloxy, arylcarbonyloxy or arylmethylcarbonyloxy group,

a 2,2-dimethoxyethyl or 2,2-diethoxyethyl group,

a C<sub>3-6</sub>-cycloalkyl or C<sub>3-6</sub>-cycloalkyl-methyl group,

R<sub>6</sub>, R<sub>7</sub> and R<sub>8</sub>, which may be identical or different, in each case denote a hydrogen atom,

a C<sub>1-8</sub>-alkyl group,

a cyclopentyl, cyclopentylmethyl, cyclohexyl or cyclohexylmethyl group,

an aryl, arylmethyl or R<sub>g</sub>CO-O-(R<sub>e</sub>CR<sub>f</sub>) group, wherein

R<sub>e</sub> denotes a hydrogen atom or a C<sub>1-4</sub>-alkyl group,

R<sub>f</sub> denotes a hydrogen atom and

R<sub>g</sub> denotes a C<sub>1-4</sub>-alkyl, cyclopentyl, cyclohexyl, C<sub>1-4</sub>-alkoxy, cyclopentyloxy or cyclohexyloxy group,

and R<sub>9</sub> denotes a methyl or ethyl group,

A<sup>2</sup> a pyrrolidino or piperidino group which is substituted by an R<sub>6</sub>O-CO or R<sub>6</sub>O-CO-C<sub>1-2</sub>-alkyl group wherein R<sub>6</sub> is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two R<sub>6</sub>O-CO or R<sub>6</sub>O-CO-C<sub>1-2</sub>-alkyl groups wherein R<sub>6</sub> is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by the group R<sub>10</sub> and is additionally substituted at a cyclic carbon atom by an R<sub>6</sub>O-CO or R<sub>6</sub>O-CO-C<sub>1-2</sub>-alkyl group, while R<sub>6</sub> is as hereinbefore defined and

R<sub>10</sub> denotes a hydrogen atom, a methyl or ethyl group,

a piperazino group which is substituted in the 4 position by an R<sub>6</sub>O-CO-C<sub>1-4</sub>-alkyl, bis-(R<sub>6</sub>O-CO)-C<sub>1-4</sub>-alkyl or (R<sub>7</sub>O-PO-OR<sub>8</sub>)-C<sub>1-2</sub>-alkyl group wherein R<sub>6</sub> to R<sub>8</sub> are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an R<sub>6</sub>O-CO-C<sub>1-2</sub>-alkyl group and is additionally substituted at a cyclic carbon atom by an R<sub>6</sub>O-CO or R<sub>6</sub>O-CO-C<sub>1-2</sub>-alkyl group wherein R<sub>6</sub> is as hereinbefore defined,

a morpholino group which is substituted by an R<sub>6</sub>O-CO or R<sub>6</sub>O-CO-C<sub>1-2</sub>-alkyl group, while R<sub>6</sub> is as hereinbefore defined,

a piperidiny group substituted in the 1 position by an R<sub>6</sub>O-CO-C<sub>1-4</sub>-alkyl, bis-(R<sub>6</sub>O-CO)-C<sub>1-4</sub>-alkyl or (R<sub>7</sub>O-PO-OR<sub>8</sub>)-C<sub>1-2</sub>-alkyl group wherein R<sub>6</sub> to R<sub>8</sub> are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 2 C<sub>1-2</sub>-alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 2 C<sub>1-2</sub>-alkyl groups,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl-NR<sub>5</sub>, 2,2-diethoxyethyl-NR<sub>5</sub>, 1,3-dioxolan-2-yl-methyl-NR<sub>5</sub> or 1,3-dioxan-2-yl-methyl-NR<sub>5</sub> group wherein R<sub>5</sub> is as hereinbefore defined,

a N-methyl-R<sub>11</sub>N or N-ethyl-R<sub>11</sub>N group wherein

A<sup>2</sup> R<sub>11</sub> denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

or D together with E denotes an R<sub>g</sub>CO-O-(R<sub>e</sub>CR<sub>f</sub>)-O-CO or (R<sub>7</sub>O-PO-OR<sub>8</sub>) group wherein R<sub>e</sub> to R<sub>g</sub> and R<sub>7</sub> and R<sub>8</sub> are as hereinbefore defined,

F and G together denote a hydrogen atom, a methoxy, ethoxy, C<sub>4-6</sub>-cycloalkoxy or C<sub>3-6</sub>-cycloalkyl-C<sub>1-3</sub>-alkoxy group,

while the aryl moieties mentioned in the definition of the abovementioned groups denote a phenyl group which may be mono- or disubstituted by R<sub>13</sub>, while the substituents may be identical or different and

R<sub>13</sub> denotes a fluorine, chlorine, bromine or iodine atom, a C<sub>1-2</sub>-alkyl, trifluoromethyl or C<sub>1-2</sub>-alkoxy group or

two groups R<sub>13</sub>, if they are bound to adjacent carbon atoms, together denote a C<sub>3-4</sub>-alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

the tautomers, the stereoisomers and the salts thereof.

Subgeneric aspect (8) of the invention is bicyclic heterocycles of general formula I, wherein

R<sub>a</sub> denotes a hydrogen atom,

R<sub>b</sub> denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R<sub>1</sub> to R<sub>3</sub>, wherein



$R_1$  and  $R_2$ , which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom or a methyl group and

$R_3$  denotes a hydrogen atom,

$R_c$  and  $R_d$  each denote a hydrogen atom,

X denotes a methine group substituted by a cyano group, or a nitrogen atom,

A denotes an imino group,

B denotes a carbonyl group,

C denotes a 1,2-vinylene or an ethynylene group,

D denotes a  $C_{1-4}$ -alkylene group,

A<sup>2</sup> a  $-CO-NR_4$ -alkylene group wherein the alkylene moiety contains 2 or 3 carbon atoms, while the linking to the adjacent group C must take place via the carbonyl group wherein

$R_4$  denotes a hydrogen atom,

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl group,

E denotes an  $R_6O-CO$ -alkylene- $NR_5$  or  $(R_7O-PO-OR_8)$ -alkylene- $NR_5$  group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 2 carbon atoms, may additionally be substituted by a methyl group or by an  $R_6O-CO$  or  $R_6O-CO$ -methyl group, while

$R_5$  denotes a hydrogen atom,

a  $C_{1-2}$ -alkyl group which may be substituted by an  $R_6O-CO$  group,

an ethyl group optionally substituted by one or two methyl groups, which is terminally substituted by a hydroxy,  $C_{1-2}$ -alkylcarbonylsulphenyl or  $C_{1-2}$ -alkylcarbonyloxy group,

a 2,2-dimethoxyethyl or 2,2-diethoxyethyl group,

$R_6$  denotes a hydrogen atom,

a  $C_{1-8}$ -alkyl group,

a cyclopentyl, cyclopentylmethyl, cyclohexyl or cyclohexylmethyl group,

a phenyl group optionally substituted by one or two methyl groups, a phenylmethyl group which may be substituted in the phenyl moiety by one or two methyl groups, a 5-indanyl group or an  $R_g\text{CO-O-(R}_e\text{CR}_f)$  group, while

$R_e$  denotes a hydrogen atom or a methyl group,

$R_f$  denotes a hydrogen atom and

$R_g$  denotes a  $C_{1-4}$ -alkyl or  $C_{1-2}$ -alkoxy group,

$R_7$  and  $R_8$ , which may be identical or different, in each case denote a hydrogen atom, a methyl, ethyl or phenyl group,

a pyrrolidino or piperidino group which is substituted by an  $R_6\text{O-CO}$  or  $R_6\text{O-CO-methyl}$  group, wherein  $R_6$  is as hereinbefore defined,

A<sup>2</sup> a pyrrolidino or piperidino group which is substituted by two  $R_6\text{O-CO}$  or  $R_6\text{O-CO-methyl}$  groups wherein  $R_6$  is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by the group  $R_{10}$  and additionally at a cyclic carbon atom by an  $R_6\text{O-CO}$  group, while  $R_6$  is as hereinbefore defined and

$R_{10}$  denotes a hydrogen atom, a methyl or ethyl group,

a piperazino group which is substituted in the 4 position by an  $R_6\text{O-CO-C}_{1-4}$ -alkyl, bis- $(R_6\text{O-CO})\text{-C}_{1-4}$ -alkyl or  $(R_7\text{O-PO-OR}_8)\text{-C}_{1-2}$ -alkyl group wherein  $R_6$  to  $R_8$  are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an  $R_6\text{O-CO-methyl}$  group and additionally at a cyclic carbon atom by an  $R_6\text{O-CO}$  group wherein  $R_6$  is as hereinbefore defined,

a morpholino group which is substituted by an  $R_6\text{O-CO-}$  group, wherein  $R_6$  is as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 2  $C_{1-2}$ -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 2  $C_{1-2}$ -alkyl groups,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl-NR<sub>5</sub>, 2,2-diethoxyethyl-NR<sub>5</sub> or 1,3-dioxolan-2-yl-methyl-NR<sub>5</sub>-group wherein R<sub>5</sub> is as hereinbefore defined,

an N-methyl-R<sub>11</sub>N or N-ethyl-R<sub>11</sub>N group wherein

R<sub>11</sub> denotes a 2-oxo-tetrahydrofuran-3-yl or 2-oxo-tetrahydrofuran-4-yl group,

or D together with E denotes an R<sub>g</sub>CO-O-(R<sub>e</sub>CR<sub>f</sub>)-O-CO group wherein R<sub>e</sub> to R<sub>g</sub> are as hereinbefore defined,

F and G together denote a hydrogen atom,

a methoxy, ethoxy, C<sub>4-6</sub>-cycloalkoxy or C<sub>3-6</sub>-cycloalkyl-C<sub>1-3</sub>-alkoxy group,

the tautomers, the stereoisomers and the salts thereof.

Subgeneric aspect (9) of the invention is bicyclic heterocycles of general formula I, characterised in that R<sub>b</sub> denotes one of the optionally substituted 1-phenyl-ethyl groups mentioned in the respective subgeneric aspects 5, 6, 7 or 8,

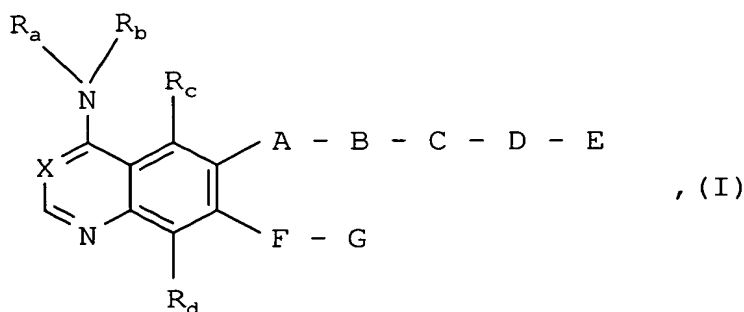
the tautomers, the stereoisomers and the salts thereof.

Subgeneric aspect (10) of the invention is bicyclic heterocycles of general formula I according to at least one of subgeneric aspects 5 to 8, characterised in that F and G together denote one of the cycloalkoxy or cycloalkyl-alkoxy groups mentioned in the respective subgeneric aspects 5, 6, 7 or 8,

the tautomers, the stereoisomers and the salts thereof.

Subgeneric aspect (11) of the invention is bicyclic heterocycles of general formula I according to at least one of subgeneric aspects 5 to 8, characterised in that E denotes one of the optionally substituted 2-oxo-morpholino groups mentioned in the respective subgeneric aspects 5, 6, 7 or 8.

Subgeneric aspect (12) of the invention is bicyclic heterocycles of general formula



wherein

R<sub>a</sub> denotes a hydrogen atom or a C<sub>1-4</sub>-alkyl group,

R<sub>b</sub> denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R<sub>1</sub> to R<sub>3</sub>, whilst

R<sub>1</sub> and R<sub>2</sub>, which may be identical or different, in each case denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

a C<sub>1-4</sub>-alkyl, hydroxy, C<sub>1-4</sub>-alkoxy, C<sub>3-6</sub>-cycloalkyl, C<sub>4-6</sub>-cycloalkoxy, C<sub>2-5</sub>-alkenyl or C<sub>2-5</sub>-alkynyl group,

an aryl, aryloxy, arylmethyl or arylmethoxy group,

17 a C<sub>3-5</sub>-alkenyloxy or C<sub>3-5</sub>-alkynyloxy group, wherein the unsaturated moiety may not be linked to the oxygen atom,

a C<sub>1-4</sub>-alkylsulphenyl, C<sub>1-4</sub>-alkylsulphinyl, C<sub>1-4</sub>-alkylsulphonyl, C<sub>1-4</sub>-alkylsulphonyloxy, trifluoromethylsulphenyl, trifluoromethylsulphinyl or trifluoromethylsulphonyl group,

a methyl or methoxy group substituted by 1 to 3 fluorine atoms,

an ethyl or ethoxy group substituted by 1 to 5 fluorine atoms,

a cyano or nitro group or an amino group optionally substituted by one or two C<sub>1-4</sub>-alkyl groups, wherein the substituents may be identical or different, or

R<sub>1</sub> together with R<sub>2</sub>, if they are bound to adjacent carbon atoms, denote a -CH=CH-CH=CH-, -CH=CH-NH or -CH=N-NH group and

R<sub>3</sub> denotes a hydrogen, fluorine, chlorine or bromine atom,

a C<sub>1-4</sub>-alkyl, trifluoromethyl or C<sub>1-4</sub>-alkoxy group,

R<sub>c</sub> and R<sub>d</sub>, which may be identical or different, in each case denote a hydrogen, fluorine or chlorine atom, a methoxy group, or a methyl group optionally substituted by a methoxy, dimethylamino, diethylamino, pyrrolidino, piperidino or morpholino group,

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an oxygen atom or an imino group optionally substituted by a C<sub>1-4</sub>-alkyl group,

B denotes a carbonyl or sulphonyl group,

C denotes a 1,3-allenylene, 1,1 or 1,2-vinylene group which may be substituted in each case by one or two methyl groups or by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by 1 to 4 methyl groups or by a trifluoromethyl group,

A<sup>2</sup> D together with E denotes a hydrogen atom,

a C<sub>1-4</sub>-alkyl group optionally substituted by 1 to 5 fluorine atoms,

a C<sub>3-6</sub>-cycloalkyl group,

an aryl, heteroaryl, C<sub>1-4</sub>-alkylcarbonyl, arylcarbonyl or C<sub>1-4</sub>-alkoxycarbonyl group,

an aminocarbonyl, C<sub>1-4</sub>-alkylaminocarbonyl or di-(C<sub>1-4</sub>-alkyl)-aminocarbonyl group or

a carbonyl group, which is substituted by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups, a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by an imino group substituted by the group R<sub>10</sub>, by a sulphinyl or sulphonyl group, wherein R<sub>10</sub> is defined as in claim 1,

F denotes a C<sub>1-6</sub>-alkylene group, a -O-C<sub>1-6</sub>-alkylene group, wherein the alkylene moiety is linked to the group G, or an oxygen atom, whilst the latter may not be linked to a nitrogen atom of the group G, and

G denotes an R<sub>6</sub>O-CO-alkylene-NR<sub>5</sub>, (R<sub>7</sub>O-PO-OR<sub>8</sub>)-alkylene-NR<sub>5</sub> or (R<sub>7</sub>O-PO-R<sub>9</sub>)-alkylene-NR<sub>5</sub>-group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 6 carbon atoms, may additionally be substituted by one or two C<sub>1-2</sub>-alkyl groups or by an R<sub>6</sub>O-CO or R<sub>6</sub>O-CO-C<sub>1-2</sub>-alkyl group, wherein R<sub>5</sub> to R<sub>9</sub> are defined as in claim 1,

a 4- to 7-membered alkyleneimino group which is substituted by an R<sub>6</sub>O-CO, (R<sub>7</sub>O-PO-OR<sub>8</sub>), (R<sub>7</sub>O-PO-R<sub>9</sub>), R<sub>6</sub>O-CO-C<sub>1-4</sub>-alkyl, bis-(R<sub>6</sub>O-CO)-C<sub>1-4</sub>-alkyl, (R<sub>7</sub>O-PO-OR<sub>8</sub>)-C<sub>1-4</sub>-alkyl or (R<sub>7</sub>O-PO-R<sub>9</sub>)-C<sub>1-4</sub>-alkyl group wherein R<sub>6</sub> to R<sub>9</sub> are defined as in claim 1,

a 4- to 7-membered alkyleneimino group which is substituted by two  $R_6O-CO$  or  $R_6O-CO-C_{1.4}$ -alkyl groups or by an  $R_6O-CO$ -group and an  $R_6O-CO-C_{1.4}$ -alkyl group wherein  $R_6$  is defined as in claim 1,

a piperazino or homopiperazino group which is substituted in the 4 position by the group  $R_{10}$  and is additionally substituted at a cyclic carbon atom by an  $R_6O-CO$ , ( $R_7O-PO-OR_8$ ), ( $R_7O-PO-R_9$ ),  $R_6O-CO-C_{1.4}$ -alkyl, bis- $(R_6O-CO)-C_{1.4}$ -alkyl, ( $R_7O-PO-OR_8$ )- $C_{1.4}$ -alkyl or ( $R_7O-PO-R_9$ )- $C_{1.4}$ -alkyl group wherein  $R_6$  to  $R_{10}$  are defined as in claim 1,

a piperazino or homopiperazino group which is substituted in the 4 position by the group  $R_{10}$  and is additionally substituted at cyclic carbon atoms by two  $R_6O-CO$  or  $R_6O-CO-C_{1.4}$ -alkyl groups or by an  $R_6O-CO$  group and an  $R_6O-CO-C_{1.4}$ -alkyl group wherein  $R_6$  and  $R_{10}$  are defined as in claim 1,

A2 a piperazino or homopiperazino group which is substituted in each case in the 4 position by an  $R_6O-CO-C_{1.4}$ -alkyl, bis- $(R_6O-CO)-C_{1.4}$ -alkyl, ( $R_7O-PO-OR_8$ )- $C_{1.4}$ -alkyl or ( $R_7O-PO-R_9$ )- $C_{1.4}$ -alkyl group wherein  $R_6$  to  $R_9$  are defined as in claim 1,

a piperazino or homopiperazino group which is substituted in the 4 position by an  $R_6O-CO-C_{1.4}$ -alkyl, bis- $(R_6O-CO)-C_{1.4}$ -alkyl, ( $R_7O-PO-OR_8$ )- $C_{1.4}$ -alkyl or ( $R_7O-PO-R_9$ )- $C_{1.4}$ -alkyl group and is additionally substituted at cyclic carbon atoms by one or two  $R_6O-CO$  or  $R_6O-CO-C_{1.4}$ -alkyl groups or by an  $R_6O-CO$ -group and an  $R_6O-CO-C_{1.4}$ -alkyl group wherein  $R_6$  to  $R_9$  are defined as in claim 1,

a morpholino or homomorpholino group which is substituted in each case by an  $R_6O-CO$ , ( $R_7O-PO-OR_8$ ), ( $R_7O-PO-R_9$ ),  $R_6O-CO-C_{1.4}$ -alkyl, bis- $(R_6O-CO)-C_{1.4}$ -alkyl, ( $R_7O-PO-OR_8$ )- $C_{1.4}$ -alkyl or ( $R_7O-PO-R_9$ )- $C_{1.4}$ -alkyl group wherein  $R_6$  to  $R_9$  are defined as in claim 1,

a morpholino or homomorpholino group which is substituted by two  $R_6O-CO$  or  $R_6O-CO-C_{1.4}$ -alkyl groups or by an  $R_6O-CO$ -group and an  $R_6O-CO-C_{1.4}$ -alkyl group wherein  $R_6$  is defined as in claim 1,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group  $R_{10}$ , whilst the abovementioned 5- to 7-membered rings are in each case additionally substituted at a carbon atom by an  $R_6O-CO$ , ( $R_7O-PO-OR_8$ ), ( $R_7O-PO-R_9$ ),  $R_6O-CO-C_{1.4}$ -alkyl, bis- $(R_6O-CO)-C_{1.4}$ -alkyl, ( $R_7O-PO-OR_8$ )- $C_{1.4}$ -alkyl or ( $R_7O-PO-R_9$ )- $C_{1.4}$ -alkyl group wherein  $R_6$  to  $R_{10}$  are defined as in claim 1,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group  $R_{10}$ , while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by two  $R_6O-CO$  or  $R_6O-CO-C_{1.4}$ -alkyl groups or by an  $R_6O-CO$ -group and an  $R_6O-CO-C_{1.4}$ -alkyl group wherein  $R_6$  and  $R_{10}$  are defined as in claim 1,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an  $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl,  $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or  $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein  $R_6$  to  $R_9$  are defined as in claim 1,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an  $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl,  $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or  $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by one or two  $R_6O-CO$  or  $R_6O-CO-C_{1-4}$ -alkyl groups or by an  $R_6O-CO$ -group and an  $R_6O-CO-C_{1-4}$ -alkyl group wherein  $R_6$  to  $R_9$  are defined as in claim 1,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

A<sup>2</sup> a 2-oxo-morpholinyl group which is substituted in the 4 position by a hydrogen atom, by a  $C_{1-4}$ -alkyl,  $R_6O-CO-C_{1-4}$ -alkyl,  $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or  $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group, while  $R_6$  to  $R_9$  are defined as in claim 1 and the abovementioned 2-oxo-morpholinyl groups are in each case linked to a carbon atom of the group F,

a morpholino or thiomorpholino group which is substituted in the 2 position by a  $C_{1-4}$ -alkoxy group,

a morpholino or thiomorpholino group which is substituted in the 2 and 6 position by a  $C_{1-4}$ -alkoxy group,

a  $C_{1-4}$ -alkyl- $NR_5$ -group wherein the  $C_{1-4}$ -alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a di- $(C_{1-4}$ -alkoxy)-methyl or tri- $(C_{1-4}$ -alkoxy)-methyl group, whilst  $R_5$  is defined as in claim 1,

a  $C_{1-4}$ -alkyl- $NR_5$ -group wherein the  $C_{1-4}$ -alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is terminally substituted in each case by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl-group optionally substituted by one or two methyl groups, while  $R_5$  is defined as in claim 1,

an  $R_hNR_5$ -group wherein  $R_5$  is as hereinbefore defined and  $R_h$  denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group optionally substituted by one or two methyl groups,

whilst by the aryl moieties mentioned in the definitions of the abovementioned groups is meant a phenyl group which in each case may be monosubstituted by  $R_{12}$ , mono-, di- or trisubstituted by  $R_{13}$  or monosubstituted by  $R_{12}$  and additionally mono- or disubstituted by  $R_{13}$ , whilst the substituents may be identical or different and

$R_{12}$  denotes a cyano, carboxy,  $C_{1-4}$ -alkoxycarbonyl, aminocarbonyl,  $C_{1-4}$ -alkylaminocarbonyl, di- $(C_{1-4}$ -alkyl)-aminocarbonyl,  $C_{1-4}$ -alkylsulphenyl,  $C_{1-4}$ -alkylsulphinyl,  $C_{1-4}$ -alkylsulphonyl, hydroxy,  $C_{1-4}$ -alkylsulphonyloxy, trifluoromethoxy, nitro, amino,  $C_{1-4}$ -alkylamino, di- $(C_{1-4}$ -alkyl)-amino,  $C_{1-4}$ -alkyl-carbonylamino, N- $(C_{1-4}$ -alkyl)- $C_{1-4}$ -alkylcarbonylamino,  $C_{1-4}$ -alkylsulphonylamino, N- $(C_{1-4}$ -alkyl)- $C_{1-4}$ -alkylsulphonylamino, aminosulphonyl,  $C_{1-4}$ -alkylaminosulphonyl or di- $(C_{1-4}$ -alkyl)-aminosulphonyl group or a carbonyl group, which is substituted by a 5- to 7-membered alkyleneimino group, wherein in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N- $(C_{1-4}$ -alkyl)-imino group, and

$A^2$   $R_{13}$  denotes a fluorine, chlorine, bromine or iodine atom, a  $C_{1-4}$ -alkyl, trifluoromethyl or  $C_{1-4}$ -alkoxy group or

two groups  $R_{13}$ , if they are bound to adjacent carbon atoms, together denote a  $C_{3-5}$ -alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

and moreover, the heteroaryl groups mentioned in the definitions of the abovementioned groups also include a 5-membered heteroaromatic group which contains an imino group, an oxygen or sulphur atom or an imino group, an oxygen or sulphur atom and one or two nitrogen atoms, or

a 6-membered heteroaromatic group which contains one, two or three nitrogen atoms,

whilst the abovementioned 5-membered heteroaromatic groups may be substituted in each case by 1 or 2 methyl or ethyl groups and the abovementioned 6-membered heteroaromatic groups may be substituted in each case by 1 or 2 methyl or ethyl groups or by a fluorine, chlorine, bromine or iodine atom, or by a trifluoromethyl, hydroxy, methoxy or ethoxy group,

the tautomers, the stereoisomers and the salts thereof.

Subgeneric aspect (13) of the invention comprises bicyclic heterocycles of general formula I according to subgeneric aspect 12, wherein

$R_a$  denotes a hydrogen atom,

$R_b$  denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups  $R_1$  to  $R_3$ , while

$R_1$  and  $R_2$ , which may be identical or different, each denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

a methyl, ethyl, hydroxy, methoxy, ethoxy, amino, cyano, vinyl or ethynyl group,

an aryl, aryloxy, arylmethyl or arylmethoxy group,



a methyl or methoxy group substituted by 1 to 3 fluorine atoms or

R<sub>1</sub> together with R<sub>2</sub>, if they are bound to adjacent carbon atoms, denote a -CH=CH-CH=CH-, -CH=CH-NH or -CH=N-NH group and

R<sub>3</sub> denotes a hydrogen, fluorine, chlorine or bromine atom,

R<sub>c</sub> and R<sub>d</sub> in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an imino group optionally substituted by a methyl or ethyl group,

B denotes a carbonyl group,

C denotes a 1,1- or 1,2-vinylene group which is substituted in each case by one or two methyl groups or may be substituted by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by a methyl or trifluoromethyl group,

D together with E denotes a hydrogen atom,

a methyl, trifluoromethyl or aryl group,

F denotes an -O-C<sub>1-4</sub>-alkylene group, wherein the alkylene moiety is linked to the group G, or an oxygen atom, while this may not be linked to a nitrogen atom of the group G, and

G denotes an R<sub>6</sub>O-CO-alkylene-NR<sub>5</sub>, (R<sub>7</sub>O-PO-OR<sub>8</sub>)-alkylene-NR<sub>5</sub> or (R<sub>7</sub>O-PO-R<sub>9</sub>)-alkylene-NR<sub>5</sub> group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C<sub>1-2</sub>-alkyl groups or by an R<sub>6</sub>O-CO or R<sub>6</sub>O-CO-C<sub>1-2</sub>-alkyl group, while R<sub>5</sub> to R<sub>9</sub> are defined as in claim 2,

a 4- to 7-membered alkyleneimino group which is substituted by an R<sub>6</sub>O-CO, R<sub>6</sub>O-CO-C<sub>1-4</sub>-alkyl or bis-(R<sub>6</sub>O-CO)-C<sub>1-4</sub>-alkyl group wherein R<sub>6</sub> is defined as in claim 2,

a 4- to 7-membered alkyleneimino group which is substituted by two R<sub>6</sub>O-CO or R<sub>6</sub>O-CO-C<sub>1-4</sub>-alkyl groups wherein R<sub>6</sub> is defined as in claim 2,

a piperazino or homopiperazino group which is substituted in the 4 position by the group  $R_{10}$  and is additionally substituted at a cyclic carbon atom by an  $R_6O-CO$ ,  $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein  $R_6$  and  $R_{10}$  are defined as in claim 2,

a piperazino or homopiperazino group which is substituted in the 4 position by the group  $R_{10}$  and is additionally substituted at cyclic carbon atoms by two  $R_6O-CO$  or  $R_6O-CO-C_{1-4}$ -alkyl groups wherein  $R_6$  and  $R_{10}$  are defined as in claim 2,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an  $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl,  $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or  $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein  $R_6$  to  $R_9$  are defined as in claim 2,

A<sup>2</sup>  
a piperazino or homopiperazino group which is substituted in the 4 position by an  $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group and additionally at cyclic carbon atoms by one or two  $R_6O-CO$  or  $R_6O-CO-C_{1-4}$ -alkyl groups wherein  $R_6$  is defined as in claim 2,

a morpholino or homomorpholino group which is substituted in each case by an  $R_6O-CO$ ,  $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein  $R_6$  is defined as in claim 2,

a morpholino or homomorpholino group which is substituted by two  $R_6O-CO$  or  $R_6O-CO-C_{1-4}$ -alkyl groups wherein  $R_6$  is defined as in claim 2,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group  $R_{10}$ , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at a carbon atom by an  $R_6O-CO$ ,  $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein  $R_6$  and  $R_{10}$  are defined as in claim 2,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group  $R_{10}$ , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by two  $R_6O-CO$  or  $R_6O-CO-C_{1-4}$ -alkyl groups wherein  $R_6$  and  $R_{10}$  are defined as in claim 2,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an  $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl,  $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or  $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein  $R_6$  to  $R_9$  are defined as in claim 2,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an  $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by one or two  $R_6O-CO$  or  $R_6O-CO-C_{1-4}$ -alkyl groups wherein  $R_6$  is defined as in claim 2,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a C<sub>1-4</sub>-alkyl or R<sub>6</sub>O-CO-C<sub>1-4</sub>-alkyl group, while R<sub>6</sub> is defined as in claim 2 and the abovementioned 2-oxo-morpholinyl groups are each are linked to a carbon atom of the group F,

a morpholino group which is substituted in the 2 position by a C<sub>1-4</sub>-alkoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a C<sub>1-4</sub>-alkoxy group,

a C<sub>1-4</sub>-alkyl-NR<sub>5</sub> group wherein the C<sub>1-4</sub>-alkyl moiety, which is straight-chained, is terminally substituted by a di-(C<sub>1-4</sub>-alkoxy)-methyl group, while R<sub>5</sub> is defined as in claim 2,

A<sup>2</sup>  
a C<sub>1-4</sub>-alkyl-NR<sub>5</sub> group wherein the C<sub>1-4</sub>-alkyl moiety, which is straight-chained, is terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group, while R<sub>5</sub> is defined as in claim 2,

a R<sub>h</sub>NR<sub>5</sub> group wherein R<sub>5</sub> is defined as in claim 2 and R<sub>h</sub> denotes a substituted 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group optionally by one or two methyl groups,

while the aryl moieties mentioned in the definition of the abovementioned groups denote a phenyl group which may in each case be monosubstituted by R<sub>12</sub>, mono- or disubstituted by R<sub>13</sub> or monosubstituted by R<sub>12</sub> and additionally mono or disubstituted by R<sub>13</sub>, while the substituents may be identical or different and

R<sub>12</sub> denotes a cyano, C<sub>1-2</sub>-alkoxycarbonyl, aminocarbonyl, C<sub>1-2</sub>-alkylaminocarbonyl, di-(C<sub>1-2</sub>-alkyl)-aminocarbonyl, C<sub>1-2</sub>-alkylsulphenyl, C<sub>1-2</sub>-alkylsulphinyl, C<sub>1-2</sub>-alkylsulphonyl, hydroxy, nitro, amino, C<sub>1-2</sub>-alkylamino or di-(C<sub>1-2</sub>-alkyl)-amino group and

R<sub>13</sub> denotes a fluorine, chlorine, bromine or iodine atom, a C<sub>1-2</sub>-alkyl, trifluoromethyl or C<sub>1-2</sub>-alkoxy group or

two groups R<sub>13</sub>, if they are bound to adjacent carbon atoms, together denote a C<sub>3-5</sub>-alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

the tautomers, the stereoisomers and the salts thereof.

Subgeneric aspect (14) of the invention comprises bicyclic heterocycles of general formula I according to subgeneric aspect 12, wherein

R<sub>a</sub> denotes a hydrogen atom,

$R_b$  denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups  $R_1$  to  $R_3$ , while

$R_1$  and  $R_2$ , which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom, or a methyl, trifluoromethyl, methoxy, ethynyl or cyano group,

$R_3$  denotes a hydrogen atom,

$R_c$  and  $R_d$  in each case denote a hydrogen atom,

$X$  denotes a methine group substituted by a cyano group, or a nitrogen atom,

$A$  denotes an imino group,

$B$  denotes a carbonyl group,

$C$  denotes a 1,1- or 1,2-vinylene group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group,

$D$  together with  $E$  denotes a hydrogen atom,

a methyl, trifluoromethyl or aryl group,

$F$  denotes an  $-O-C_{1-4}$ -alkylene group, wherein the alkylene moiety is linked to the group  $G$ , or an oxygen atom, while this may not be linked to a nitrogen atom of the group  $G$ , and

$G$  denotes an  $R_6O-CO$ -alkylene- $NR_5$  group wherein the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two  $C_{1-2}$ -alkyl groups or by an  $R_6O-CO$  or  $R_6O-CO-C_{1-2}$ -alkyl group, while  $R_5$  and  $R_6$  are defined as in claim 3,

a pyrrolidino or piperidino group which is substituted by an  $R_6O-CO$  or  $R_6O-CO-C_{1-2}$ -alkyl group wherein  $R_6$  is defined as in claim 3,

a pyrrolidino or piperidino group which is substituted by two  $R_6O-CO$  or  $R_6O-CO-C_{1-2}$ -alkyl groups wherein  $R_6$  is defined as in claim 3,

a piperazino group which is substituted in the 4 position by the group  $R_{10}$  and additionally at a cyclic carbon atom by an  $R_6O-CO$ , or  $R_6O-CO-C_{1-2}$ -alkyl group, while  $R_6$  and  $R_{10}$  are defined as in claim 3,

a piperazino group which is substituted in the 4 position by an  $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or  $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein  $R_6$  to  $R_8$  are defined as in claim 3,

a piperazino group which is substituted in the 4 position by an  $R_6O-CO-C_{1-2}$ -alkyl group and additionally at a cyclic carbon atom by an  $R_6O-CO$  or  $R_6O-CO-C_{1-2}$ -alkyl group wherein  $R_6$  is defined as in claim 3,

a morpholino group which is substituted by an  $R_6O-CO$  or  $R_6O-CO-C_{1-2}$ -alkyl group, while  $R_6$  is defined as in claim 3,

a piperidinyl group substituted in the 1 position by an  $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or  $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein  $R_6$  to  $R_8$  are defined as in claim 3,

A2  
a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a methyl, ethyl or  $R_6O-CO-C_{1-2}$ -alkyl group, while  $R_6$  is defined as in claim 3 and the abovementioned 2-oxo-morpholinyl groups in each case are linked to a carbon atom of the group F,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl- $NR_5$ , 2,2-diethoxyethyl- $NR_5$ , 1,3-dioxolan-2-yl-methyl- $NR_5$  or 1,3-dioxan-2-yl-methyl- $NR_5$  group wherein  $R_5$  is defined as in claim 3,

while the aryl moieties mentioned in the definition of the abovementioned groups denote a phenyl group which may be mono- or disubstituted by  $R_{13}$ , while the substituents may be identical or different and

$R_{13}$  denotes a fluorine, chlorine, bromine or iodine atom, a  $C_{1-2}$ -alkyl, trifluoromethyl or  $C_{1-2}$ -alkoxy group or

two groups  $R_{13}$ , if they are bound to adjacent carbon atoms, together denote a  $C_{3-4}$ -alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

the tautomers, the stereoisomers and the salts thereof.

Subgeneric aspect (15) of the invention comprises bicyclic heterocycles of general formula I according to subgeneric aspect 12, wherein

denotes a hydrogen atom,

$R_b$  denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups  $R_1$  to  $R_3$ , wherein

$R_1$  and  $R_2$ , which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom or a methyl group and

$R_3$  denotes a hydrogen atom,

$R_c$  and  $R_d$  each denote a hydrogen atom,

X denotes a methine group substituted by a cyano group, or a nitrogen atom,

A denotes an imino group,

B denotes a carbonyl group,

C denotes a 1,2-vinylene or an ethynylene group,

D together with E denotes a hydrogen atom or a methyl group,

F denotes an  $-O-C_{1-4}$ -alkylene group, while the alkylene moiety is linked to the group G, or an oxygen atom, which may not be linked to a nitrogen atom of the group G, and

G denotes an  $R_6O-CO$ -alkylene- $NR_5$  group wherein the alkylene moiety, which is straight-chained and contains 1 or 2 carbon atoms, may additionally be substituted by a methyl group or by an  $R_6O-CO$  or  $R_6O-CO$ -methyl group, while  $R_5$  and  $R_6$  are defined as in claim 4,

a pyrrolidino or piperidino group which is substituted by an  $R_6O-CO$  or  $R_6O-CO$ -methyl group wherein  $R_6$  is defined as in claim 4,

a pyrrolidino or piperidino group which is substituted by two  $R_6O-CO$  or  $R_6O-CO$ -methyl groups wherein  $R_6$  is defined as in claim 4,

a piperazino group which is substituted in the 4 position by an  $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or  $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein  $R_6$  to  $R_8$  are defined as in claim 4,

a piperidinyl group substituted in the 1 position by an  $R_6O-CO-C_{1-2}$ -alkyl group wherein  $R_6$  is defined as in claim 4,

the tautomers, the stereoisomers and the salts thereof.

Subgeneric aspect (16) of the invention comprises bicyclic heterocycles of general formula I according to at least one of subgeneric aspects 12 to 15, characterised in that  $R_b$  denotes one of the optionally substituted 1-phenyl-ethyl groups mentioned in the respective subgeneric aspects 12, 13, 14 or 15,

the tautomers, the stereoisomers and the salts thereof.

Subgeneric aspect (17) of the invention is the following compounds of general formula I:

- A<sup>2</sup>
- (a) 4-[(3-bromophenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline,
- (b) 4-[(3-bromophenyl)amino]-7-(3-{4-[3-(ethoxycarbonyl)propyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline,
- (c) 4-[(3-bromophenyl)amino]-7-({1-[(ethoxycarbonyl)methyl]-piperidin-4-yl}oxy)-6-[(vinylcarbonyl)amino]-quinazoline,
- (d) 4-[(3-bromophenyl)amino]-7-(3-{4-[(diethoxyphosphoryl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline,
- (e) 4-[(3-bromophenyl)amino]-7-(3-{N-[(ethoxycarbonyl)methyl]-N-methylamino}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline,
- (f) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-quinazoline,
- (g) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(diethoxyphosphoryl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline,
- (h) (R)-4-[(1-phenylethyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline,
- (i) 4-[(3-bromophenyl)amino]-6-({4-[N-(2,2-dimethoxyethyl)-N-methylamino]-1-oxo-2-buten-1-yl}amino)-7-methoxy-quinazoline,
- (j) 4-[(3-bromophenyl)amino]-6-{[4-(2-ethoxy-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-methoxy-quinazoline,
- (k) 4-[(3-bromophenyl)amino]-3-cyano-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-quinoline,
- (l) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline,
- (m) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[2-(ethoxycarbonyl)-ethyl]-N-[(ethoxycarbonyl)methyl]amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline,
- (n) 4-[(3-chloro-4-fluorophenyl)amino]-6-{[4-(2-oxo-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline,

(o) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclobutyloxy-quinazoline,

(p) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-(2-cyclopropylethoxy)-quinazoline,

A<sup>2</sup>  
(q) (*S*)-4-[(3-chloro-4-fluorophenyl)amino]-6-({4-[2-(methoxycarbonyl)-pyrrolidin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline,

(r) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-[2-(acetylsulphanyl)ethyl]amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline und

(s) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)-methyl]-N-[2-(methylcarbonyloxy)ethyl]amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline  
and the salts thereof.

---